## Corrielus, Jean B.

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|---|---|
| **From:** | Tom Williams [tom@holtzmaninc.com] |
| **Sent:** | Monday, May 04, 2009 10:20 AM |
| **To:** | Corrielus, Jean B. |
| **Subject:** | Re: 10/697,393 |

Examiner Corrielus,

You are correct that a discrete FFT converts a series of time samples into a series of frequency domain samples, and a discrete inverse FFT converts the frequency domain samples back into time domain samples.

Actually, except for a constant multiplier (1/N), the IFFT and the FFT perform the same mathematical operation. For a given fixed-size series of numbers, N, the multiplier is a constant.

The FDIMM (Frequency Domain Inverse Matrix Modulation) implementation has similarities to OFDM, which is very well known in the art.

However, from the common usage of OFDM I have seen in the art, the IFFT is conventionally used at the transmitter, and the FFT is used at the receiver. I do not know why the use of the IFFT at the transmitter was chosen.

Citation from:
http://en.wikipedia.org/wiki/OFDM#Implementation_using_the_FFT_algorithm

## " Implementation using the FFT algorithm

The orthogonality allows for efficient modulator and demodulator implementation using the FFT algorithm on the receiver side, and inverse FFT on the sender side. Although the principles and some of the benefits have been known since the 1960s, OFDM is popular for wideband communications today by way of low-cost digital signal processing components that can efficiently calculate the FFT."

I would not perfer to go against the common usage and practise of doing the IFFT at the transmitter, although mathematically it works.

On the proposed changes to the claims :
Claim 9. line 13, delete "excised"; line 13 after "symbols", add "and the transmission matrix" - I cannot find the words "excised" or "symbols".

Claim 10 line 20, insert "excised" before "frequency". - Are you assuming the "excised" symbols are the good symbols or the bad ones? Please comment.

Please feel free to call me at 303-817-1895 (cell).

Regards,
\Thomas H. Williams\

> ----- Original Message -----
> **From:** Corrielus, Jean B.
> **To:** Tom Williams
> **Sent:** Saturday, April 25, 2009 8:55 AM
> **Subject:** RE: 10/697,393
>
> Mr. Williams,
> The changes seem to be acceptable except for the fact that the specification page 12, lines 10-11, "discrete inverse Fourier transform (DIFT)", should be replaced by "discrete Fourier transform (DFT)"; page 12, line 12, "IFFT" should be replaced by "FFT" and page 13, line 7, "DIFT" should be replace by "DFT" and line 8, "IFFT" should be replaced by "FFT" to be consistent

with known function of a DFT and FFT that generate "frequency domain signal".
   Note the email on 4/3/09 for proposed changes to the claims.
Thanks,
Examiner corrielus

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**From:** Tom Williams [mailto:tom@holtzmaninc.com]
**Sent:** Wednesday, April 22, 2009 8:06 AM
**To:** Corrielus, Jean B.
**Subject:** Re: 10/697 ,393

Dear Examiner Corrielus,

Please see attached suggestions.

I look forward to your response and comments.

Regards,
Tom Williams

----- Original Message -----

> **From:** Corrielus, Jean B.
> **To:** Tom Williams
> **Sent:** Monday, April 06, 2009 9:16 AM
> **Subject:** RE: 10/697 ,393

Please call me tomorrow morning April 7 at 9:30AM . Thanks, Examiner Corrielus

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**From:** Tom Williams [mailto:tom@holtzmaninc.com]
**Sent:** Monday, April 06, 2009 10:58 AM
**To:** Corrielus, Jean B.
**Subject:** Re: 10/ 697,393

Dear Examiner Corrielus,

I sent a reply via US Postal Service before I received your E-mail message.  Should I amend the response I already sent, or create another response in the series?  Please advise on how to proceed.

Re:Fig. 5 per box 510, the signal transmitted to the receiver is in frequency domain. However, Box 522 converts a time domain signal to frequency. The signal at the input to box 522 appears to be already in frequency domain.  Please comment and correct.
In addition in box 522, "time data" should be replaced by "time".
Would it be acceptable to re-label box 510 "PERFORM IFFT" and re-label box 522 as "PERFORM FFT"?

Re: Specification:
Page 13, lines 10-12, teaches that the signal is transmitted in frequency domain this is  not consistent with page, lines 15-16, that recites that  the time domain data is converted into frequency domain.
As a general comment, there is a duality between time and frequency.  Signals may be viewed as being transmitted in either time or frequency.  If you connect a signal to a spectrum analyzer, you get to see it in the frequency domain.  If you connect the very same signal to an oscilloscope you can see it in the time domain, but it is one and the same identical signal.  If you connect the same signal to a vector signal analyzer you may view it in both the time and frequency domains simultaneously.

A distinction is what a sequence of numbers represents: data are either a time-domain signal or a frequency-domain signal.  If the sequence represents the signal in the time domain, it can be converted into a frequency domain sequence by a FFT (fast Fourier transform).  If the sequence represents the signal in the frequency domain, it can be converted into the time domain using a IFFT (inverse fast Fourier transform).  This transform is used in Orthogonal Frequency Division Multiplexing (OFDM) which is well known in the art.

May I call you tomorrow early to resolve?

Regards,

Tom Williams

----- Original Message -----

**From:** Corrielus, Jean B.
**To:** Tom Williams
**Sent:** Friday, April 03, 2009 4:16 PM
**Subject:** RE: 10/ 697 ,393

Dear Mr. Williams,
    The application including proposed amendment were reviewed with the following effect(s);
Drawing:
Fig. 5 per box 510, the signal transmitted to the receiver is in frequency domain. However, Box 522 converts a time domain signal to frequency. The signal at the input to box 522 appears to be already in frequency domain. Please comment and correct.
In addition in box 522, "time data" should be replaced by "time".
Specification:
Page 13, lines 10-12, teaches that the signal is transmitted in frequency domain this is  not consistent with page, lines 15-16, that recites that  the time domain data is converted into frequency domain.
 Claims:
claim 9 (draft version), line 15-16, please deleted "excised corrupt symbols"; line 13, delete "excised"; line 13 after "symbols", add "and the transmission matrix"
claim 10 (draft version), line 19, replace "excised" by "corrupt"; line 20, insert "excised" before "frequency".
 Such amendment is necessary so as to be consistent with the specification.

Note that each drawing figure needs to be corrected to move the reference numbers outside of the drawing boxes and to use lead lines to point the reference number to its box. In addition, note the additional changes to fig. 5.
Annotated and  replacement sheets will need to be filed.
Please email/call if you have any question.
Thanks, Examiner Corrielus


**From:** Tom Williams [mailto:tom@holtzmaninc.com]
**Sent:** Thursday, March 12, 2009 10:14 AM
**To:** Corrielus, Jean B.
**Subject:** RE: 10/ 697 ,393

Examiner Corrielus,

I believe the correct forms for us to communicate by E-mail are still in place.

Please check my attached proposed response to your 2/3/2009 office action for compliance with your objections.

Also, which drawings need to be re-done?.  I believe that Fig. 1, 2, 4, and 5 have numbers inside boxes.

I believe that I need "annotatation sheets as well as "replacemnt shheets".  Am I correct?

Thank you.

/Thomas H. Williams/

No virus found in this incoming message.
Checked by AVG - www.avg.com
Version: 8.0.238 / Virus Database: 270.11.43/2043 - Release Date: 04/06/09 06:22:00

No virus found in this incoming message.
Checked by AVG - www.avg.com
Version: 8.0.238 / Virus Database: 270.12.4/2078 - Release Date: 04/24/09 07:54:00